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EXAMINER	
SCHINDLER, DAVID M	
ART UNIT	**PAPER NUMBER**
2862	

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/696,215	GUALTIERI, DEVLIN M.	
	Examiner	Art Unit	
	David Schindler	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,9-15 and 18-25* is/are rejected.

7)☒ Claim(s) *7,8,16 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the communication received 9/27/2005.

Response to Arguments

2. Applicant's arguments filed 9/27/2005 have been fully considered but they are not persuasive.

(With regard to this section, Oates et al. (4,644,270) will be referred to as "the Oates reference").

Applicant argues "As is clear from the description and corresponding illustrations, the oscillator (80) supplies a fixed-frequency signal to the sensor (S1), and not an FM modulated signal as recited in each of the independent claims" on lines 1-3 of page 2 of the Remarks.

With respect to the above argument, the Examiner respectfully disagrees. The claims recite, in one form or another, "an oscillator circuit coupled to the sensor coil and operable to supply a sensor signal that is frequency modulated based on the proximity of the sensor coil to each of the turbine blades" as stated for example on lines 5-7 of Claim 1. This claim does not require an oscillator that supplies an FM modulated signal as argued above, but rather the claim requires an oscillator circuit that supplies a signal to the sensor that is modulated by the proximity of the sensor coil to each turbine blade. The Examiner notes paragraph [0034] of page 11 of Applicant's specification which states, in part, "As is also generally known, when an inductance coil, such as the sensor coil 302, is in close proximity to a conductor, such as a turbine blade, the conductor acts as a shorted coil turn that counteracts the inductance of the last coil turn. Thus, the

sensor coil 302, when implemented in the turbine engine 200 as outlined above, will exhibit an inductance (L) that varies with the proximity of the sensor coil 302 to the turbine blades 204 ... As such, the frequency of the sensor signal 312 supplied by the oscillator circuit 304 will concomitantly vary with the proximity of the sensor coil 302 to the turbine blades 204. Thus, the sensor signal 312 is frequency modulated based on the proximity of the turbine blades 204 to the sensor coil." Therefore, the Oates reference meets the claimed limitations as the reference discloses for example an oscillator circuit connected to a sensor coil which supplies a signal to the sensor coil (Column 4, Lines 19-23 of the Oates reference), and therefore as the turbine blades rotate past the coil, the signal supplied to the sensor coil via the oscillator will become frequency modulated. This is further supported by the last two lines of column 4 and line 1 of column 5 of the Oates reference which states, in part, "the sensor's output signal which is modulated by the passage of the turbine blades."

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 3, 10, 20, 21, 24, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Oates et al. (4,644,270).

As to Claims 1 and 25,

Oates et al. discloses a sensor coil (S1); an oscillator circuit (60) coupled to the sensor coil (Figure 5) and operable to supply a sensor signal that is frequency modulated based on the proximity of the sensor coil to each of the turbine blades ((Column 4, Lines 50-58) and (Column 4, Lines 65-68) and (Column 5, Lines 1-6)); and a frequency modulation (FM) detector circuit ((12) in combination with (14)) adapted to receive the frequency modulated sensor signal and operable (Column 3, Lines 3-11), in response thereto, to supply a proximity signal having an amplitude that varies with, and is representative of, the proximity of each of the turbine blades to the non-rotating turbine component ((see Title) and (Column 4, Lines 19-39) and (Column 5, Lines 44-54) and (Column 6, Lines 63-68) and (Column 7, Lines 1-15) and (Column 7, Lines 21-25) and (Column 8, Lines 54-68) and (Column 9, Lines 1-11) and (Figures 1, 4, 5, 9, and 11)).

As to Claim 2,

Oates et al. discloses display (16) coupled to receive the proximity signal from the FM detector and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud ((Figures 1, 2, and 4) and (Title) and (Abstract, Lines 1-3) and (Column 3, Lines 46-56) and (Column 11, Lines 19-32)).

As to Claim 3,

Oates et al. the FM detector circuit includes an FM demodulator (Column 3, Lines 3-5).

As to Claim 10,

Oates et al. discloses a peak detector coupled to receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal (Column 4, Lines 40-48).

As to Claim 20,

Oates et al. discloses a turbine case (see title); a turbine wheel (40) rotationally mounted within the turbine case ((Figures 1 and 2) and (Column 1, Lines 20-22) and (Column 3, Lines 33-40)); a plurality of turbine blades extending from the turbine wheel toward the turbine case (Figure 2); and a turbine blade proximity sensor system including: a sensor coil (S1) disposed at least partially within the turbine case (Figure 2); an oscillator circuit (60) coupled to the sensor coil (Figure 5) and operable to supply a sensor signal that is frequency modulated based on the proximity of the sensor coil to each of the turbine blades ((Column 4, Lines 50-58) and (Column 4, Lines 65-68) and (Column 5, Lines 1-6)); and a frequency modulation (FM) detector circuit ((12) in combination with (14)) coupled to receive the frequency modulated sensor signal and operable (Column 3, Lines 3-11), in response thereto, to supply a proximity signal having an amplitude that varies with, and is representative of, the proximity of each of the turbine blades to either the turbine case or one or more components mounted thereto ((see Title) and (Column 4, Lines 19-39) and (Column 5, Lines 44-54) and (Column 6, Lines 63-68) and (Column 7, Lines 1-15) and (Column 7, Lines 21-25) and (Column 8, Lines 54-68) and (Column 9, Lines 1-11) and (Column 11, Lines 19-32) and (Figures 1, 4, 5, 9, and 11)).

As to Claim 21,

Oates et al. discloses supplying a sensor signal that is frequency modulated based on the proximity of each of the turbine blades to the non-rotating turbine component ((Column 4, Lines 50-58) and (Column 4, Lines 65-68) and (Column 5, Lines 1-6)); demodulating the frequency modulated sensor signal, to thereby supply a proximity signal having an amplitude that varies with, and is representative of, the proximity of each of the turbine blades to the non-rotating turbine component ((Column 3, Lines 3-11) and (Abstract, Lines 1-6) and (see Title) and (Column 4, Lines 19-39) and (Column 5, Lines 44-54) and (Column 6, Lines 63-68) and (Column 7, Lines 1-15) and (Column 7, Lines 21-25) and (Column 8, Lines 54-68) and (Column 9, Lines 1-11) and (Column 11, Lines 19-32) and (Figures 1, 4, 5, 9, and 11)).

As to Claim 24,

Oates et al. discloses detecting a peak value of the proximity signal amplitude variations, to thereby determine a minimum turbine blade proximity to the non-rotating turbine component ((Column 4, Lines 40-48) and (Figure 5) and (Abstract, Lines 1-6) and (Column 11, Lines 19-32)).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Iida et al. (6,658,216).

Oates et al. discloses as explained above.

Oates et al. does not disclose the FM demodulator includes a ratio detector.

Iida et al. discloses the FM demodulator includes a ratio detector (Column 6, Lines 33-37).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include the FM demodulator includes a ratio detector as taught by Iida et al. in order to improve signal demodulation.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Arms et al. (5,497,147).

Oates et al. does not disclose the oscillator circuit is configured to wirelessly transmit the sensor signal; and the FM detector circuit is configured to wirelessly receive the transmitted sensor signal.

Arms et al. discloses the oscillator circuit is configured to wirelessly

transmit the sensor signal; and the FM detector circuit is configured to wirelessly receive the transmitted sensor signal ((Figures 4 and 5) and (Column 2, Lines 33-51).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include the oscillator circuit is configured to wirelessly transmit the sensor signal; and the FM detector circuit is configured to wirelessly receive the transmitted sensor signal as taught by Arms et al. in order to enhance functionality by allowing for remote data processing.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Ham et al. (3,177,711).

Oates et al. discloses as explained above.

Oates et al. does not disclose the oscillator circuit includes one or more capacitance circuit elements electrically coupled in parallel with the sensor coil.

Ham et al. discloses the oscillator circuit includes one or more capacitance circuit elements electrically coupled in parallel with the sensor coil ((Figure) and (Column 2, Lines 36-55).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include the oscillator circuit includes one or more capacitance circuit elements electrically coupled in parallel with the sensor coil as taught by Ham et al. in order to tune the winding to approximate resonance when a vane is closely adjacent to the winding (Column 2, Lines 51-54).

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Wilkinson (GB 2167603 A).

Oates et al. discloses as explained above.

Oates et al. does not disclose a ceramic core, and a conductor selected from a group consisting of platinum and molybdenum.

Wilkinson discloses a ceramic core and a conductor consisting of platinum (Page 1, Left Column, Lines 51-54).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include a ceramic core and a conductor consisting of platinum as taught by Wilkinson in order to have a sensor that gives a fast an accurate response and can withstand corrosive environments (Page 1, Left Column, Lines 29-33).

11. Claims 11, 12, 14, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Stowell (4,842,477).

As to Claim 11,

Oates et al. discloses a sensor coil (S1); an oscillator circuit (60) coupled to the sensor coil (Figure 5) and operable to supply a sensor signal that is frequency modulated based on the proximity of the sensor coil to each of the turbine blades ((Column 4, Lines 50-58) and (Column 4, Lines 65-68) and (Column 5, Lines 1-6)); and a frequency modulation (FM) detector circuit ((12) in combination with (14)) adapted to receive the frequency modulated sensor signal and operable (Column 3, Lines 3-11), in response thereto, to supply a proximity signal having an amplitude that varies with, and

is representative of, the proximity of each of the turbine blades to the non-rotating turbine component ((see Title) and (Column 4, Lines 19-39) and (Column 5, Lines 44-54) and (Column 6, Lines 63-68) and (Column 7, Lines 1-15) and (Column 7, Lines 21-25) and (Column 8, Lines 54-68) and (Column 9, Lines 1-11) and (Figures 1, 4, 5, 9, and 11)), and a controller (14) coupled to receive the proximity signal from the FM detector (Figure 5).

Oates et al. does not disclose a controller to control the proximity of the turbine blades to the non-rotating turbine component.

Stowell discloses controlling the proximity of the turbine blades to the non-rotating turbine component (Abstract, Lines 10-15).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include a controller to control the proximity of the turbine blades to the non-rotating turbine component given the above disclosure and the teaching of Stowell in order to prevent turbine malfunction by preventing blade damage.

As to Claim 12,

Oates et al. discloses the non-rotating component is a turbine case (see title).

Oates et al. does not disclose the controller controls the proximity of the turbine blades to the non-rotating component by controlling turbine shroud temperature.

Stowell discloses controlling the proximity of the turbine blades to the non-rotating component by controlling turbine shroud temperature (Abstract, Lines 10-15).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include the controller controls the proximity of the turbine blades to the non-

rotating component by controlling turbine shroud temperature given the above disclosure and teaching of Stowell in order to prevent turbine malfunction by preventing blade damage.

As to Claim 14,

Oates et al. discloses display coupled to receive the proximity signal from the FM detector and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud ((Figures 1 and 4) and (Column 3, Lines 54-68) and (Column 4, Lines 1-4) and (Column 11, Lines 19-32)).

As to Claim 19,

Oates et al. discloses a peak detector coupled to receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal (Column 4, Lines 40-48).

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Stowell (4,842,477) and in further view of Davison (4,230,436).

Oates et al. in view of Stowell discloses as explained above.

Oates et al. in view of Stowell does not disclose the controller, in response to the proximity signal, supplies one or more valve control signals, and wherein the system includes one or more valves in fluid communication between a cooling air source and the turbine shroud, each valve having an actuator coupled to receive one or more of the valve control signals and operable, in response thereto, to selectively move its

associated valve between an open position and a closed position, to thereby selectively cool the turbine case.

Davison discloses one valve in fluid communication between a cooling air source, the valve having an actuator that selectively moves the valve between an open position and a closed position, to thereby selectively maintain optimum rotor-to-shroud clearances ((Figures 1 and 8A-8C) and (Column 6, Lines 28-33) and (Column 8, 24-30) and (Abstract, Lines 4-11)).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. in view of Stowell to include the controller, in response to the proximity signal, supplies one or more valve control signals, and wherein the system includes one or more valves in fluid communication between a cooling air source and the turbine shroud, each valve having an actuator coupled to receive one or more of the valve control signals and operable, in response thereto, to selectively move its associated valve between an open position and a closed position, to thereby selectively cool the turbine case given the above disclosure and teaching of Davison in order to prevent turbine malfunction by preventing blade damage.

13. Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Stowell (4,842,477) and in further view of Ham et al. (3,177,711).

Oates et al. in view of Stowell discloses as explained above.

Oates et al. in view of Stowell does not disclose the oscillator circuit includes one

or more capacitance circuit elements electrically coupled in parallel with the sensor coil.

Ham et al. discloses the oscillator circuit includes one or more capacitance circuit elements electrically coupled in parallel with the sensor coil ((Figure) and (Column 2, Lines 36-55).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. in view of Stowell to include the oscillator circuit includes one or more capacitance circuit elements electrically coupled in parallel with the sensor coil as taught by Ham et al. in order to tune the winding to approximate resonance when a vane is closely adjacent to the winding (Column 2, Lines 51-54).

14. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Stowell (4,842,477) and in further view of Wilkinson (GB 2167603 A).

Oates et al. in view of Stowell discloses as explained above.

Oates et al. in view of Stowell does not disclose a ceramic core, and a conductor selected from a group consisting of platinum and molybdenum.

Wilkinson discloses a ceramic core and a conductor consisting of platinum (Page 1, Left Column, Lines 51-54).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. in view of Stowell to include a ceramic core and a conductor consisting of platinum as taught by Wilkinson in order to have a sensor that gives a fast an accurate response and can withstand corrosive environments (Page 1, Left Column, Lines 29-33).

15. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oates et al. (4,644,270) in view of Stowell (4,842,477).

As to Claim 22,

Oates et al. discloses as explained above.

Oates et al. does not disclose varying the proximity of each of the turbine blades to the non-rotating turbine component in response to the proximity signal.

Stowell discloses varying the proximity of each of the turbine blades to the non-rotating turbine component for active clearance control ((see title) and (Abstract, Lines 10-15).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include varying the proximity of each of the turbine blades to the non-rotating turbine component in response to the proximity signal given the above disclosure and teaching of Stowell in order to prevent turbine malfunction by preventing blade damage.

As to Claim 23,

Oates et al. does not disclose varying the non-rotating turbine component temperature in response to the proximity signal, to thereby vary the proximity of each of the turbine blades to the non-rotating component.

Stowell discloses varying non-rotating turbine component temperature to thereby vary the proximity of each of the turbine blades to the non-rotating turbine component (Abstract, Lines 10-15).

It would have been obvious to a person of ordinary skill in the art to modify Oates et al. to include varying the non-rotating turbine component temperature in response to the proximity signal, to thereby vary the proximity of each of the turbine blades to the non-rotating component given the above disclosure and teaching of Stowell in order to prevent turbine malfunction by preventing blade damage.

Allowable Subject Matter

16. Claims 7, 8, 16, and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is an examiner's statement of reasons for allowance:

As to Claims 7 and 16,

The primary reason for the allowance of claim 7 is the inclusion of a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having a capacitance that acts as at least one of the capacitive circuit elements. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

As to Claims 8 and 17,

The primary reason for the allowance of claim 8 is the inclusion of a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having an effective capacitance that is electrically coupled in parallel with the sensor coil, to

thereby form an LC circuit. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Schindler

David Schindler
Examiner
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DS

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